ST-031M

Multifunction Counter Surveillance Device

USER MANUAL

2012

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1. Introduction

ST031M is a new generation multifunction counter surveillance device for detection and localization Special Technical Means of Obtaining Secret Information (STMOSI) and for solving other information protection tasks related to information protection technical measures effectiveness evaluation.

ST031M is a successor of well know series of TSCM devices "Piranha".

All features of previous models are incorporated into ST031M:

- ST031M technical features and characteristics allow detection of wide range of mostly dangerous STMOSI devices.
- Independence from external power supplies allow autonomous operation and removes limitation of device use.
- Connection to PC allows controlling and information logging directly from computer screen.

ST031M main differences from previous models ST031 and ST031P:

- Selective wide band detector of electromagnetic field detector with adjustable bandwidth from 1 to 40 MHz is used for detection of STMOSI.
- Selective HF detector bandwidth is wider than in previous models and is from 140 to 4420 MHz.
- Wider band of wire lines scanning receiver 0,05-30 MHz.
- ST031M uses color graphics display which increases informativeness of displayed information.
- ST031M user interface is intuitively understandable.
- ST031M comes in waterproof case, made of impact resistant plastic. Compact and comfortable styling ensures safety of the device and its components during storage and transportation.

2. General characteristics of the device

2.1. Purpose and main features

Multifunctional searching device ST 031M is designed for the detection and localization of technical surveillance measures and to identify the natural channels of information leakage, as well as for quality control of data protection.

ST 031M maintains performance standards and compliance with the parameters of the technical conditions when the supply voltage is not lower than 4.8V, the atmospheric pressure from 630 to 820 mm Hg, ambient temperature of -5 to +350 ° C and humidity not exceeding 95%.

ST 031M allows us to perform following search tasks:

Discovery of the facts and determining the location of the radio-emitting devices, which creates a potentially dangerous information leakage radiation.

These means primarily include the following:

- Radio microphones;
- Telephone transmitters;
- Radio-stethoscopes;
- Concealed video cameras equipped with a radio channel for transmission of information;
- Technical means or systems for spatial radio frequency radiation;
- Beacons of the systems used for moving objects monitoring (e.g. people, transportation means, goods etc.);
- Unauthorized radio stations, radio handsets, and also telephones with radio-extension;
- Radio modems and digital wireless access systems.

Identification of digital protocols used in the detected radio signals. Device is able to distinguish between signals from the base station and signals from cellular phones.

The discovery of fact and location of STM means transmitting information within infrared band. These means primarily include the following:

- STM means capable of transmitting in an infrared frequency band;
- Technical means of the systems of spatial irradiation within infrared band.

Detection and localization of STM means which use conductive lines of various intended application, for transmission of information, as well as the technical means of information processing, creating informative crosstalk signals on the cable wires.

Such means may include:

- Devices transmitting intercepted information by AC 220V mains lines and capable of operating at frequencies up to 30MHz;
- Technical means of imposing a linear high-frequency signals operating at frequencies above 150 kHz;
- Devices transmitting intercepted information by subscriber telephone lines, the lines of fire and burglar alarm systems with a carrier frequency above 20 kHz
- Computers and other technical means of production, reproduction and transmission of information.

Detection and qualitative assessment of informative electromagnetic fields created by office and communications equipment, search of concealed wiring, potentially suitable for use by STM.

Identification and qualitative assessment of vibration and acoustic channels of information leakage, as well as monitoring effectiveness of vibro-acoustic systems used to protect premises.

2.2. Packing and delivery set

Device ST031M set is subject-oriented solution to the above search tasks, to ensure versatility and autonomy of the work, as well as to provide convenience and reliability of transportation and storage.

2.2.1. Packing

The device is made in a portable version. High-impact, waterproof plastic carrying case NANUK-915 (Fig. 1) is used for transportation and storage of the device. External dimensions of the case are presented in Figure 2.

Safety during transportation and storage, as well as the convenience of working with the device is provided by the original laying, which consists of two parts: the upper (extracted from the case) and lower (non-removable).

Laying of ST031M accessories is presented in Figure 3.

Each component, supplied with ST031M, has its own individual place. To avoid mechanical damage, the device and its components must be placed in accordance with the standard laying scheme.

Figure 1

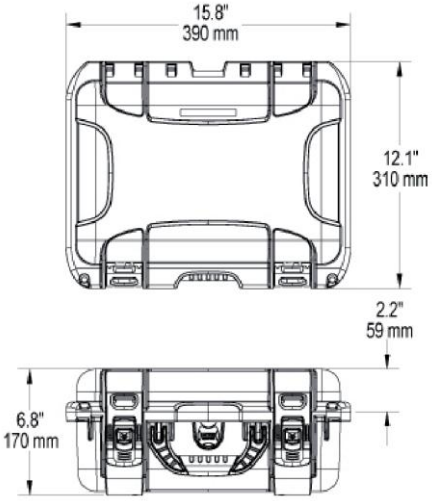

Figure 2

Figure 3

2.2.2. Delivery set

ST031M delivery set includes:

1. control, processing and display unit (main unit)
2. adapter of scanning receiver BWLC031M
3. low frequency amplifiers adapter BAC031M
4. extensions to adapters (such as "Crocodile") (2 pcs)
5. high-frequency telescopic antenna
6. headphones
7. adapter to connect the unit to the multi-wire cables
8. telephone adapter (2 pieces)
9. cable connector (8x4)
10. cable connector (8x6)
11. cable connector (8x8)
12. charger
13. cable to connect to a PC
14. Flash card with software
15. Carrying case
16. User manual and device passport.

Figure 4. shows the main components of ST031M (numbering corresponds to the numbering of the figure).

Figure 4

2.3. Design of the main control, processing and display unit

The main unit is the main part of ST031M. Figure 5 shows the appearance of the front, top and bottom panels of the main unit.
At the top of the main unit are:

- RF connector for antenna «CH 1"
- jack for connecting scanning receiver adapter «CH 2"
- jack for connecting sensors and adapters «CH 3"
- handle power on / off and volume control «ON / OFF VOL»
- The front of the main unit includes:
    a. color graphic LCD display (320x240 pixels)
    b. power indicator «PWR»
    c. two windows of infrared transmitters for wireless headphones;
    d. 12 keys membrane keyboard.

Keys assignment:

F1 F2 F3 F4	Group function buttons. Their function varies depending on the mode ST031M and indicated on the display directly above the button.
	Buttons to change settings.
ENTER	Confirm the selected option button / mode.
ESC	Button to return to the previous mode, or cancel the command.
FUNC	Additional functional button. Provides access to additional features.
HELP	Contexts tips.

More detail button assignments will be presented in the description of controls and indicators in Section 2.
Bottom panel has:

- Headphone jack **«PHONE»**
- Digital port for connection of external digital devices **«EXT»**
- Socket for connecting to a PC **«USB»**
- Socket to connect power supply / charger **«DC5V»**

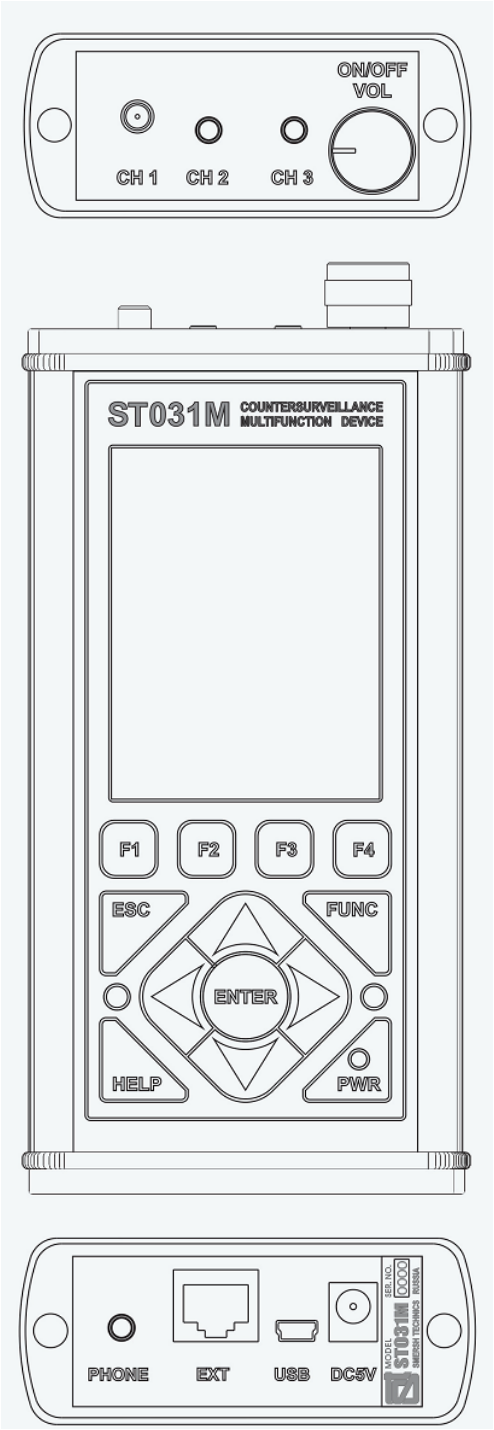

Figure 5

3. ST031M operation modes

Systemotechnical and software foundation, incorporated in the design and operation of the device algorithms make it possible to apply it in the following modes:

- selective high-frequency electromagnetic field detector (in the frequency range 140-4500MGts);
- Scanning Analyzer for wire lines (in the frequency range of 0.05-30MHz);
- Amplifier of low-frequency signals (in the frequency range 0.02-100kHz).

When connecting one or another external device, you must manually chose appropriate mode of operation.

3.1. Switching-on ST031M

Switching the device On/Off is made by rotating volume knob «ON / OFF VOL», located on the top panel (Fig. 5).

To access the "Select Channel" mode, press any button on a ST031M keyboard.

3.2. Mode "Channel selection"

"Channel selection" is primary menu where user can chose operating mode or set the system configuration.

The screen in the "Channel selection" is shown in Figure 7.

The numbers indicated in the figure:

1. System information text
2. the name of the current mode
3. Battery charge indicator
4. time display (hh: mm)
5. menu “Chose mode”
6. the menu item "Channel 1"
7. the menu item "Channel 2"
8. the menu item "Channel 3"
9. the menu item "Settings"
10. currently selected menu item
11. function keys assignment
12. function name assigned to button F1
13. function name assigned to button F2
14. function name assigned to button F3
15. function name assigned to button F4

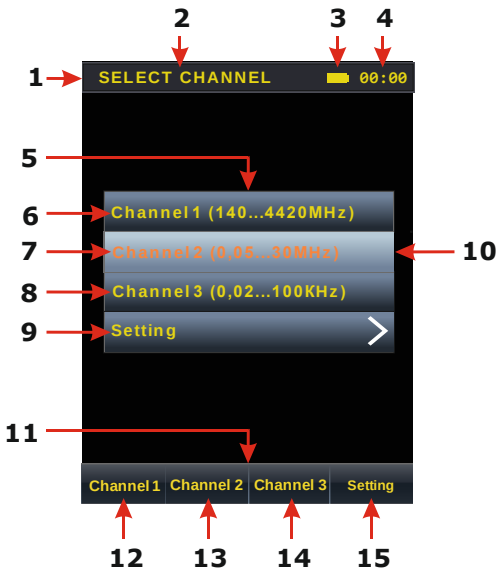

Figure 7

Available functions	Key
Menu item selection	
Activating selected mode	ENTER
Available modes	
"Channel 1" high frequency selective detector (140- 4200 MHz)	F1 or menu button pos.6 Fig.7
"Channel 2" scanning receiver (0.05 ... 30 MHz)	F2 or menu button pos. 7 Fig.7
"Channel 3" low frequency amplifier	F3 or menu button pos. 8 Fig.7
"Settings" (time, date, language, infrared headset)	F4 or menu button pos. 9 Fig.7

3.2.1. "Settings" mode

In the "Settings" menu user can set following system parameters:

- Time
- Date
- Language menu
- Enable / disable the IR headset.

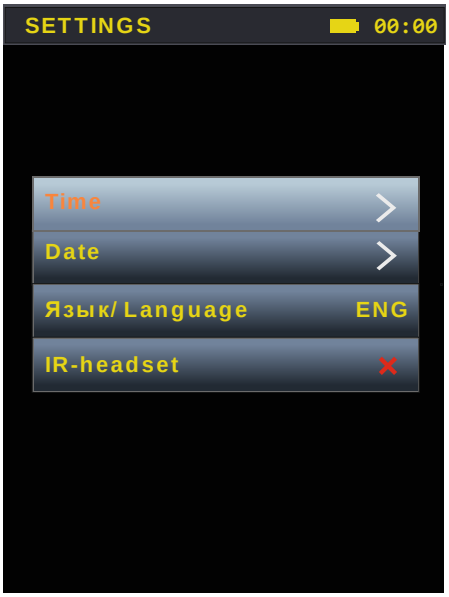

Figure 8

Setting system time

Press button **F4** or chose appropriate menu item in the "Channel Selection" mode.
To adjust the time select menu item in the box that says „Time“ and presses **ENTER**.
In the window that appears, chose between hours or minutes (Fig. 9) using the buttons **LEFT** or **RIGHT**. Use buttons **UP** or **DOWN** to set the desired value. Confirm set time by pressing button **ENTER**.
If you press the **ESC** button, the unit exit without saving your changes. New settings will be stored in memory even when power is turned off.

Figure 9

Setting system date

To adjust the time select menu item in the box that says "Date" and press **ENTER**.
In the window that appears, set the required parameters (similar to how setting time)
Confirm set values by pressing **ENTER**. Tto return to the Mode menu "Settings" press button **ESC**.

Figure 10

Selecting the Interface Language

The device has English and Russian language interface (the default is Russian).

To change language select menu item "Язык / Language" (Fig. 8) and press **ENTER**. In this menu, chose "RUS" or "EN".

Activating IR headphones

In addition to wired headphones, the instrument provides possibility to use wireless IR headphones. By default, the IR transmitter is off. In order to turn them on in the mode menu "Settings" chose "IR Headset" and press ENTER. Choose between IR mode by pressing ENTER button: ✗ - IR transmitter is disconnected or ✓ - IR transmitter is active. Press ESC to return to previous mode.

3.3. "CHANNEL 1" mode

Selective HF Detector
In this mode user can detect and identify radio signals in the frequency range from 140 to 4420 MHz, as well as to localize the sources of such signals, located in the inspected areas.

3.3.1. "Panorama" mode
This mode is the base for selective RF detector. Mode is activated in "Channel selection" menu by pressing the F1 key or by selecting the menu item "Channel 1".

The screen is shown in Fig. 11.

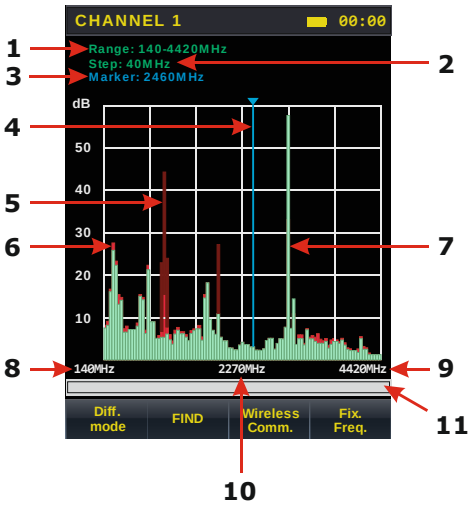

Figure 11

The numbers indicated in the figure:

1. value of lower and upper bounds of the range panorama
2. value of scan step
3. frequency corresponding to the position of the marker on display
4. screen marker
5. max. signal level at a given frequency for the time of the session (maroon color)
6. pulse component of the signal (red color)
7. constant component of the signal (green color)
8. value of the lower boundary frequency of the panorama
9. value of the upper boundary frequency of the panorama
10. value of the center frequency of the panorama
11. indicator showing current viewing band in comparison to maximum possible.

Available functions	**Key**
Changing the scanning step and limits the range of frequencies: 1, 2, 5, 10, 20, 40 MHz	UP or DOWN
Move display marker	LEFT or RIGHT
Show context tips	HELP
Available modes	

"Differential mode"	F1
"SEARCH"	F2
"Wireless networks"	F3
"Fixed frequency"	F4
Exit from current mode	
To “Chose channel” mode	ESC

3.3.2. "Differential" mode

In this mode, the signal levels, obtained in the "Panorama," taken as "zero" and displays only the exceeding set signal level. Enabling - the F1 key from the "Panorama" mode.
Indication of switch-on - change the color labels "Diff. mode" from yellow to orange and lightening the background color of the label (item 4 in Fig. 12)
The screen of the differential mode is shown in Figure 12.
Numbers indicated in the figure:

1. maximum signal level for the entire session observation for a given frequency (maroon color)
2. indication of pulse signals (yellow color)
3. indication of the average signal level (purple color)
4. Indicates if differential mode is active.

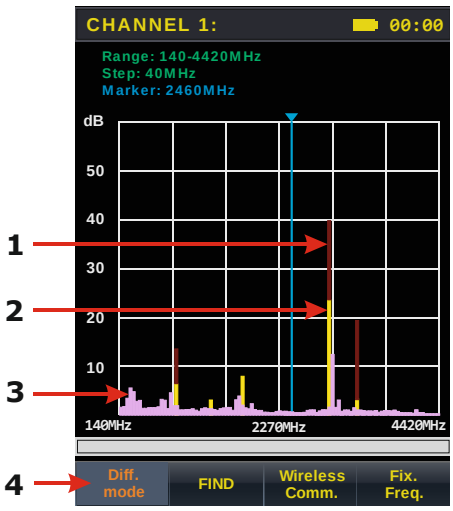

Figure 12

Available functions	**Key**
Changing the scanning step and limits the range of frequencies: 1, 2, 5, 10, 20, 40 MHz	UP or DOWN
Move display marker	LEFT or RIGHT
Show context tips	HELP
Available modes	
"Panorama mode"	F1
"SEARCH"	F2
"Wireless networks"	F3
"Fixed frequency"	F4
Exit from current mode	
To “Chose channel” mode	ESC
To “Panorama” mode	F1

3.3.3. "Fixed Frequency" mode

This mode is designed for fine-tuning to the frequency of the detected signal frequency, as well as to locate the source.
Mode activation is done from the "Panorama" mode by pressing button F4
Mode screen shown in Figure 13.
The numbers indicated in the figure:

1. the value of center frequency of the signal (corresponding to the frequency which was set in "Panorama" or "Diff. Mode" modes);
2. the value of bandwidth (corresponding to the value set in "Panorama" or "Diff. Mode" modes);
3. max. signal level for the entire observation session
4. an indicator of relative changes in signal level (shown in red pulse component)
5. an indicator of relative changes in signal level (shown in green DC component).

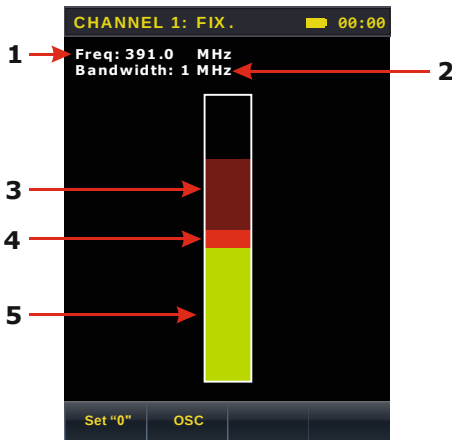

Figure 13

Available functions	**Key**
Monitoring changes in the relative signal level of the indicator (item 4, 5, Figure 13)	
Listening to the demodulated signal on speaker or headphones	
Adjust the center frequency of the signal with a step equal to the bandwidth (Figure 13 item 1)	LEFT or RIGHT
Changing the bandwidth: 1, 2, 5, 10, 20, 40 MHz (Fig. 13 key 2)	UP or DOWN
"Zeroing" the relative signal level, "Const. zero "	F1
Show context tips	HELP
Available modes	
“Oscilloscope”	F2
Return to “Panorama” or “Diff. Mode” mode	ESC

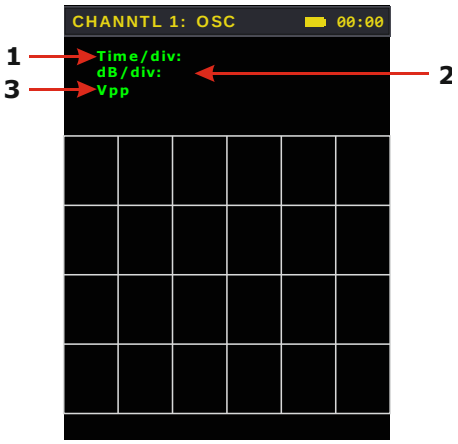

Figure 14

"Oscilloscope" Sub mode

Screen sub modes "Oscilloscope" is presented in Figure 14.

The numbers indicated in the figure:

1. value of dividing the time axis
2. value of the amplitude axis (dB)
3. measured value of signal amplitude (dB)

Available functions	**Key**
Acoustic control of demodulated signal	
Visual inspection of demodulated signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 µs / div, 1, 3, 6 ms / div	LEFT or RIGHT
Scale change of fission axis amplitude: 2.5 or 12,5 dB / div	UP or DOWN
Call of contexts tips	HELP
Exit to previous mode	ESC

3.3.4. "SEARCH" Mode

Automatic detection of signal levels that exceed an adaptive threshold. The search is performed in frequency range defined in the "Panorama" or "Diff. regime." modes.
When you activate this mode (press F2 in "Panorama" mode) message is briefly displayed on screen accompanying the process of signal detection (Fig. 15).
Upon completion of the search process, forming a table presented in Figure 16, where the numbers denote:

1. total number of detected signals
2. number of detected signal in table
3. central frequency of detected signal
4. relative level of detected signal
5. additional information about the signal
6. position indicator line
7. indicator of changes in the relative level of the selected signal (shown in green DC component)
8. indicator of changes in the relative level of the selected signal (red shows the dc component).

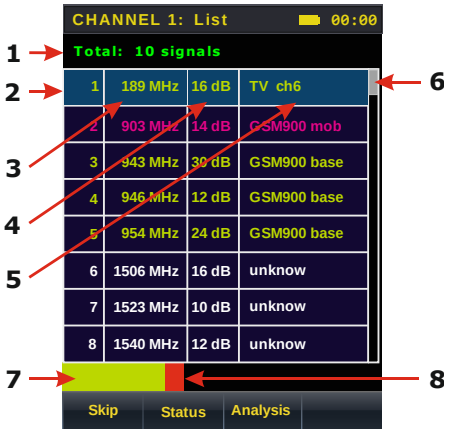

Figure 16

If you find air television signals, digital communication base stations and some other standard signals, the additional information (item 5 Figure 16) specifies the type of data signals, the color of the labels in a row - the green, which corresponds to the status of "known" (not dangerous) signal.

Upon detection of signals of digital mobile communications in the additional information (item 5 Figure 16) specifies the type of data signals, the color of text boxes in a row - red, which corresponds to the status of "dangerous" (potentially dangerous) signal.

Upon detection of signals of a type that cannot be identified automatically, the additional information (item 5 Figure 16) indicates «unknown», while the color labels in a row - white, which corresponds to the status of "unknown" signal.

At its discretion, the user can change the status of the signals detected by manually.

Available functions	**Key**
The choice of the signal in the list. Selected signal is displayed as a highlighted line	UP or DOWN
Listening to the selected demodulated signal on the speaker or headphones.	
Monitoring changes in the relative signal level of the indicator (item 7, 8, Fig. 16)	
Removing the signal from the list	F1
Assignment of signal status. The options are:	Press F2
"Dangerous" - red label	
"Known" - green label	
"Unknown" - white label	
Call of contexts tips	HELP
Available modes	
"Analysis"	F3
Output mode "Panorama" without saving results	ESC

3.3.5. "Analysis" mode

In general, the work unit in the "Analysis" mode is similar to working in the "Fixed rate" mode (p.2.3.3), except that in this case there is a possibility to save changes.
Mode screen "Analysis" presented at Fig.17.
The numbers indicated in the figure:

1. value of the center frequency of the selected signal;
2. the value of fixed bandwidth;
3. max. value of the signal level at a given frequency for the entire session of observation;
4. an indicator of changes in the relative level of the selected signal (shown in red pulse component);
5. an indicator of changes in the relative level of the selected signal (shown in green DC component).

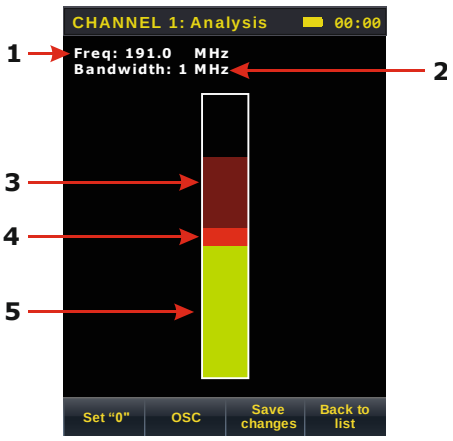

Figure 17

Available functions	**Key**
Control of the relative signal level according to the indicator (item 3, 4, Figure 17)	
Listening to the demodulated signal on speaker or headphones	
Adjust the center frequency with a step equal to the bandwidth	LEFT or RIGHT
Changing the bandwidth: 1, 2, 5, 10, 20, 40 MHz	UP or DOWN
"Zeroing" the relative level of the selected signal, "Setting zero"	F1
Save the changed value of the frequency of returning to the table of detected signals	F3
Call of contexts tips	HELP
Available modes	
"Oscilloscope"	F2
Exit from current mode:	
to the table of detected signals without saving the changed value of the center frequency of the signal	F4 or ESC
to the table of detected signals while preserving the values of the modified center frequency of the signal	F3

"Oscilloscope" Submode

Screen "Oscilloscope" submode is presented in Figure 18.
The numbers indicated in the figure:

1. value of dividing the time axis
2. value of amplitude axis scale (dB)
3. measured value of the signal amplitude (dB)

Available functions	**Key**
Acoustic control of demodulated signal	
Visual inspection of demodulated signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 µs / div, 1, 3, 6 ms / div	LEFT or RIGHT
Scale change of fission axis amplitude: 2.5 or 12,5 dB / div	UP or DOWN
Call of contexts tips	HELP
Exit to previous mode	ESC

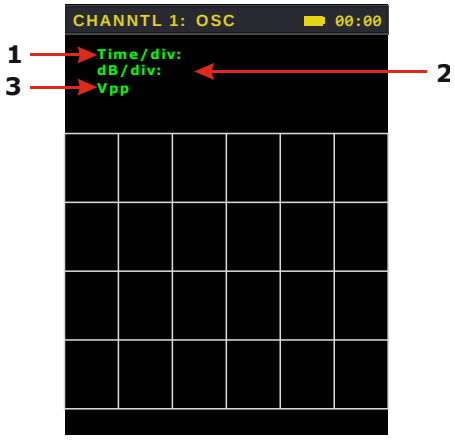

Figure 18

3.3.6. "Wireless Networks" mode

Entrance to the mode from the "Panorama" - the button F3
Mode screen control of wireless networks is shown in Figure 19.
The numbers indicated in the figure:

1. Name of a standard digital signal
2. Indicator of the relative signal level.

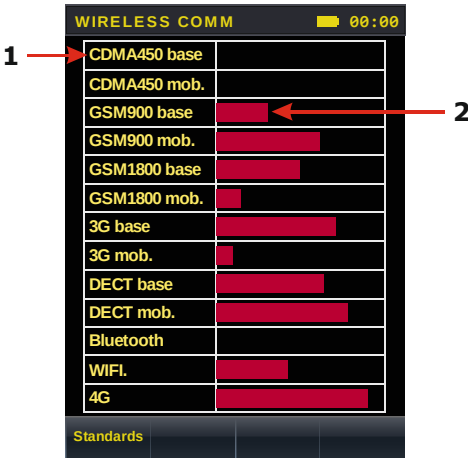

Figure 19

Available functions	**Key**
Evaluation of the relative levels of the selected wireless network standards	
Call of contexts tips	HELP
Available modes	
“Standarts”	F1
Exit to previous mode	ESC

Sub mode "Standards"
Sub mode is used to select specific standards for digital communications for their monitoring in the "Wireless Networks" mode.
The screen in the "Standards" presented at Figure 20.
The numbers indicated in the figure:

1. Name of a standard digital signal
2. a sign of disconnection / connection of a standard (X / √)
3. Table pointer.

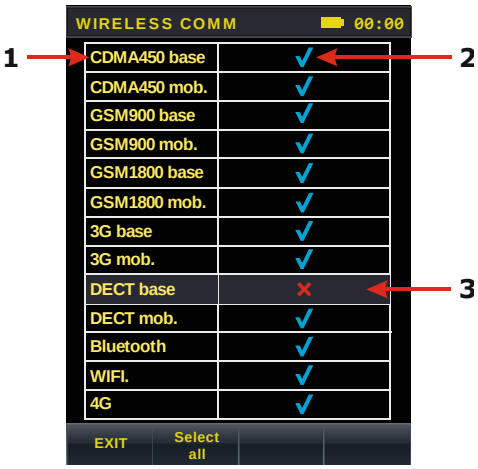

Figure 20

Available functions	**Key**
Move cursor	UP or DOWN
Switch standarts “ON” or “OFF”	ENTER
Select ALL standarts	F2
Call of contexts tips	HELP
Exit to previous mode “Wireless networks”	ESC/F1

3.3.7. Recommendations for the use ST031M in selective RF detector mode ("Channel 1")

Using ST031M in different modes of selective HF detector is focused on the detection, identification and localization of special technical means of obtaining secret information (STMOSI), transmitting the signal off-site search in the frequency range 140-4200 MHz. It should be understood that the device can detect only "active" STMOSI, ie working at the time of transfer.

Unique features implemented in ST031M selective detector are:

- The ability to detect signals exceeding the threshold in an adaptive automatic mode with the formation of a list of these signals. The list indicates the most important information about the signal (center frequency, level, information on the possible type of signal). In addition, if the frequency of the detected signal coincides with the frequencies of known signals (broadcast stations, base stations, communications systems, etc.), it is automatically assigned the status of "known", ie certainly not "dangerous". When a match is the central frequency of the detected signal with frequencies typical for mobile digital communications, such signals automatically is assigned the status of "dangerous" because it can be signals of wireless microphones that use the channel same as a standard digital protocols.
- The presence of differential treatment makes it possible-selected signals, the sources are located in the near zone, ie on-site search.
- Ability to control signal at a fixed frequency (modes' Fix. Frequency "and" Analysis "). This greatly simplifies the process of localizing the source of the signal, even against the more powerful signals.
- Ability to listen to the acoustic information on the built-in speaker or headphones allows operator to identify the signals. If you set the center frequency of coincidence with the frequency of wireless microphone located in the premises (with not encoded transmission), the headphones will hear the noise of the room. To identify the source of the detected signal is recommended that you create in a room called "Control the sound." The source of this sound can serve as a tape recorder, CD / DVD player or a specific source of the reference tone. Should not be used for this purpose the television or radio.

Should be considered dangerous signals:

- demodulated signals are correlated with the signal source reference tone (this is typical for analog microphone with "unencrypted transmission channel and a relatively simple types of encoding);
- frequencies do not coincide with the frequencies of TV channels, radio and other "known" sources;
- levels of which vary considerably when entering and navigating through the object being tested (with high probability the sources of these signals are close to the device).

In accordance with the characteristics of the selective RF detector, in general, there are three main options for transmitting STMOSI search:

- Search using the automatic mode;
- Search in manual mode;
- Search for digital mobile communications and STMOSI, based on them.

The proposed further uses of ST031M are typical and may be adjusted depending on the characteristics of the object and the challenges faced by search operators.

3.3.7.1. Search using automated signal detection mode.

This search option is essential. Its main advantages - simplicity and minimal detection time. Recommended for use on most sites, provided the low and medium levels of radio spectrum load.

No.	Action	Control element	Indication
		Preparation	
1.	Inside of the scanned area connect the RF antenna to the "SH1" and headphones to the «PHONE» at the bottom of the unit		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings" and press ENTER; - Press the F4 button	Screen "Settings" mode. Figure 8.
5.	Perform the necessary settings change and exit the into the "Channel selection" mode	In accordance with Clause 2.2.1.	
6.	Enter into the "Channel 1" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 1" and press ENTER; - Press F1 button	Basic mode selective RF Detector "Panorama" Figure 11.
		Signal detection	
7.	Enable automatic search mode	F2 button	The message as in Fig.15 will be shown on screen. Upon completion of the automatic search, results will be generated and presented on-screen table (list) of detected signals, arranged in ascending order of their center frequency. By default, cursor is located on the first row of the table. Fig.16.
8.	Select signal	Use UP or DOWN set table pointer to a string containing information about the signal of interest.	In headphones listen to demodulated signal. The indicator (position 7, 8, Fig.16) shows the relative level of constant and pulsed signal components
9.	Select mode “Analysis”	Button F3	Screen "Analysis." mode Figure 17. In headphones listen for demodulated signal. The display shows the relative level of constant and pulsed signal components
10.	Adjust the center frequency and bandwidth signal.	adjustment: frequency - LEFT or RIGHT bandwidth - UP or DOWN	By observing changes in the relative level of the signal and listening to the demodulated signal, set the frequency and the bandwidth corresponding to

			the maximum signal level and the best signal quality in the headphones
11.	Exit from the "Analysis" to the table of detected signals	Save changes - F3 button Without saving changes - Button F4 or ESC	When you press F3, detected signal parameters in the table will change in accordance with the adjustments.
12.	Changing status of the signal	Successive pressing F2	Font color changes
13.	Remove signal from list	Use UP or DOWN to set the table cursor on the signal you want to delete. Press the F1 button	The line will be removed from the list of detected signals.
Signal source localization			
14.	Chose signal	Same as in step 8	
15.	Switch-on “Analysis” mode	Same as in step 9	
16.	Setting current signal level as “Zero”	Button F1	The relative level of the signal is taken as "zero", while the level of the indicator will be significantly reduced.
17.	Locate place of signal source		By observing changes in the relative level of the indicator, find place where indicator shows maximum level.
Repeat steps 14-17 for all "dangerous" and "unknown" signals in the table.			

Notes:

If the list of detected signals contains signals whose frequency is within the 140-280 MHz range, it might be that these signals are the upper harmonics of high-power signals, with central frequencies below 140 MHz. This circumstance is due to the fact that the lower limit of the working range of the selective RF detector is 140 MHz and the device cannot record the signal at frequencies below this limit. However, their harmonics are detected reliably within the operating range.

3.3.7.2. Search in manual mode

This option is recommended to apply in a complex electromagnetic enviroment. The advantages of this method include the possibility of using selective RF detector in a differential mode, which allows distinguishing between external and internal signals (sources which are located in the near zone). However, the search takes longer than in the automatic mode.

No.	Action	Control element	Indication
Preparation			
1.	Outside of the scanned area connect the RF antenna to the "SH1" and headphones to the «PHONE» at the bottom of the unit		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings"	Screen "Settings" mode. Figure 8.

		and press ENTER; - Press the F4 button	
5.	Perform the necessary settings change and exit the into the "Channel selection" mode	In accordance with Clause 2.2.1.	
6.	Enter into the "Channel 1" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 1" and press ENTER; - Press F1 button	Basic mode selective RF Detector "Panorama" Figure 11.
7.	Enable “Differential Search” mode	F1 button	Differential search screen as in Fig.12 The signal levels obtained in the "Panorama" mode are taken as "zero." The screen displays deferential spectrum range (average - lilac color, pulse components - yellow). Purple color on the screen shows the maximum signal levels obtained in the "Panorama"
Signal detection			
8.	Enter to inspected room		
9.	Monitor change in signal levels on device screen. If increase in the levels are observed, set screen marker on to the peak of signal.	Buttons LEFT or RIGHT	
10.	Switch-on “Fixed frequency” mode	Press F4	“Fixed frequency” control mode screen. Figure 13.
11.	Fine-tuning	Adjustment: Frequency – buttons LEFT of RIGHT Bandwidth – UP or DOWN	Watching the change in the relative level of signal and listening to demodulated signal in headphones, set the frequency and bandwidth, corresponding to the maximum level and the best sound quality.
Signal source localization			
12.	Zeroing relative signal level	Button F1	The relative level of the signal is taken as "zero." Levels decrease significantly on the display.
13.	Find location of the signal source		By observing change of the indicator, find area in the room where the relative signal level shows maximum level.
Repeat operations described in steps 9-13 for all signal levels which rose at the entrance to the inspected premises.			

Notes:

For a detailed assessment of the busiest parts of the spectrum range and fine-tune the display marker in the modes of the "Panorama" and "Differential mode" it is useful to reduce on-screen viewing band (button UP).

In assessing the demodulated signals in the "Fixed frequency" mode it is recommended to use “Oscilloscope" submode.

During localization of signal sources in the "Fix. frequency" mode, operator should pay attention to changes in levels of continuous and pulse current signal components (red and green), with respect to the maximum recorded level (maroon color). In the case of moving away from the source of signal, it is clearly visible decrease in the levels of the current signal on the background of the maximal recorded level and, vice versa.

3.3.7.3. Search in “Wireless Networks” mode

"Wireless Networks" mode is designed to detect signals of the most common digital communications and data transmission systems. Mobile devices of these systems can be used as STMOSI. Selective RF detector ST031M allows not only to identify the signals of these devices, but also to localize the sources of such signals in the inspected area.

No.	Action	Control element	Indication
Preparation			
1.	Inside of the scanned area connect the RF antenna to the "SH1" and headphones to the «PHONE» at the bottom of the unit		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings" and press ENTER; - Press the F4 button	Screen "Settings" mode. Figure 8.
5.	Perform the necessary settings change and exit the into the "Channel selection" mode	In accordance with Clause 2.2.1.	
6.	Enter into the "Channel 1" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 1" and press ENTER; - Press F1 button	Basic mode selective RF Detector "Panorama" Figure 11.
Wireless networks signal detection			
7.	Enable “Wireless networks” search mode	F3 button	“Wireless networks” screen will appear Fig. 19
8.	Enter “Standarts” submode	Button F1	“Chose Wireless Devices” screen
9.	Select wireless devices	Buttons UP or DOWN. Select corresponding menu item. ENTER-activate/deactivate selected standart.	✔ - standart will be included into search list ✘ - standart will be excluded from search list
10.	Exit from “Standarts” submenu	F1 button	“Wireless networks” screen containing only selected standarts.
11.	Evaluation of selected standarts		According to selected signals levels indicator it is possible to

			determine if signal sources are in near zone.
12.	Localizing signal source		By looking at changes of signal level, determine location in the room where this level has maximum value. Further localization is performed by physical inspection of area.

It is recommended to activate following signal types while performing search:

- CDMA450 mob
- GSM900 mob
- GSM1800 mob
- 3G mob
- DECT mob
- Bluetooth
- WIFI
- 4G

The use of these devices as STMOSI is most likely.

WARNING!

It is possible that WIFI devices can be identified incorrectly as Bluetooth devices!

3.4. "CHANNEL 2" mode. Scanning receiver

In scanning receiver ("Channel 2») mode ST031M can detect STMOSI signals, transmitting information by power and low-wire lines in the frequency range from 0.05 to 30 MHz.

For convenience user interface of the channel is made by analogy with the interface of selective RF detector. Although there are specific modes and features common to wired receivers.

BWLC031M adapter is used to connect ST031M scanning receiver to inspected wire lines.

3.4.1. "Panorama" mode

This mode is the base for the scanning receiver. Mode is activated while in "Channel selection" by pressing **F2** or by selecting the menu item "Channel 2".
The screen is shown in Fig. 21.
The numbers indicated in the figure:

1. value of lower and upper bounds of range panoramas
2. value of scan step
3. frequency corresponding to the position of the marker display
4. screen marker
5. component of the signal pulse (red)
6. constant component of the signal (green)
7. value of the lower frequency boundary of the panorama
8. value of the upper frequency boundary of the panorama
9. value of the central frequency of the panorama
10. indicator, showing lower and upper range of active bandwidth.

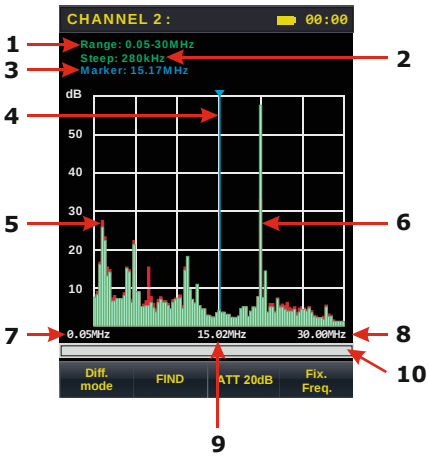

Figure 21

Available functions	**Key**
Changing the scanning step and frequencies band limits: 28, 140, 280 kHz	**UP or DOWN**
Move screen cursor	**LEFT or RIGHT**
Show context tips	**HELP**
Available modes	
“Differential mode”	**F1**
“Search”	**F2**
“Attenuator 20 dB”	**F3**
“Fixed frequency”	**F4**
Exit from current mode	
To the “Chose channel” mode	**ESC**

3.4.2. "Differential" mode

In this mode, the signal levels obtained in the „Panorama“ taken as „zero“ and display only the levels of excess.

Enabling – press **F1** key from the "Panorama" mode.

Indications include - change the color labels "Diff. regime" from yellow to orange and lightening the background color of the label (position 3 in Fig. 22)

The screen of the differential mode is shown in Figure 22.
The numbers indicated in the figure:

1. Display of pulse signals (yellow)
2. Display of the average signal level (purple color)
3. Display the activation of the differential mode.

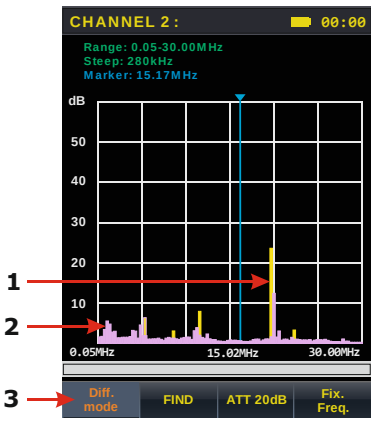

Figure 22

Available functions	**Key**
Changing the scanning step and frequencies band limits: 28, 140, 280 kHz	**UP or DOWN**
Move screen cursor	**LEFT or RIGHT**
Show context tips	**HELP**
Available modes	
“Panorama”	**F1**
“Search”	**F2**
“Attenuator 20 dB”	**F3**
“Fixed frequency”	**F4**
Exit from current mode	
To the “Chose channel” mode	**ESC**

"Attenuator" function

The function allows you to reduce the input signals at 20dB. This is necessary in cases, if the levels of interference signals in tested line are too high.

Enable - **F3** button in the "Panorama" mode.

Activating attenuation in “Differential mode” leads to the exit from this mode to the "Panorama" mode. However, when the attenuator is active, "Differential mode" is available.

Also, when the attenuator is active, following modes are available:

- automatic search ("Search")
- control signal at a fixed frequency ("Fix. frequency")

Function activation indicator - change color of the text “ATT 20 dB” in the function assignments keys line from yellow to orange, and lightening the background color of the lettering.

3.4.3. "Fixed Frequency" mode

This mode is designed for fine-tuning the central frequency of the detected signal.
Sign of the modes of the "Panorama" or "Differential mode" - the F4 button
Mode screen shown in Figure 23.
The numbers indicated in the figure:

1. the value of signal center frequency (corresponding to the frequency at which the marker was set in "Panorama" or "Diff. Mode" modes)
2. demodulator (AM or FM)
3. an indicator of relative changes in signal level (shown in red pulse component)
4. an indicator of relative changes in signal level (shown in green DC component).

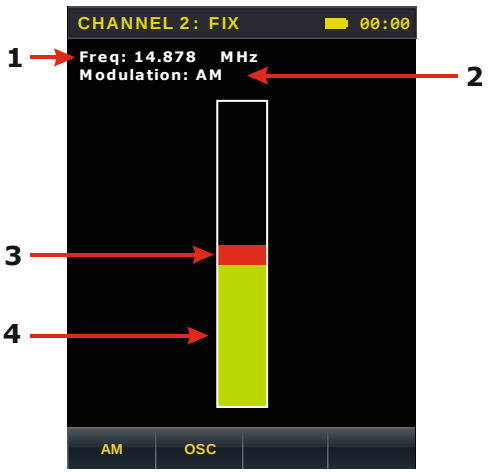

Figure 23

Available functions	**Key**
Monitoring changes in the relative signal level of the indicator (item 3, 4, Fig. 23)	
Listening to the demodulated signal on speaker or headphones	
Adjust the center frequency of the signal with a step equal to the bandwidth (position 1 Figure 23)	LEFT or RIGHT
Change demodulation type (AM/FM)	F1
Show context tips	HELP
Available modes	
“Oscilloscope”	F2
Exit to the previous mode ("Panorama" or "Diff. Mode")	ESC

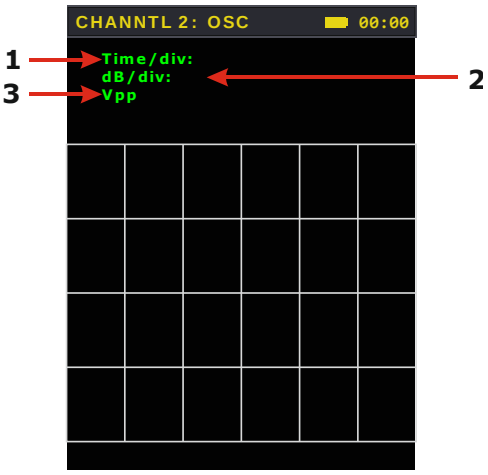

Figure 24

Submode "Oscilloscope"

"Oscilloscope" submode sreen presented at Figure 24.

The numbers indicated in the figure:

1. set the value of scale of time axis
2. set the value of scale of amplitude axis (dB)
3. measured value of the signal amplitude (dB).

Available functions	**Key**
Acoustic control of demodulated signal	
Visual control of demodulated signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 µs / div, 1, 3, 6 ms / div	**UP or DOWN**
Changing division scale of the amplitude axis 3 or 15 dB / div	**LEFT or RIGHT**
Show context tips	**HELP**
Exit to “Fixed frequency” mode	**ESC**

3.4.4. "SEARCH" mode

Automatic detection of signal levels that exceed an adaptive threshold. The search is performed in the frequency range defined in the "Panorama" or "Diff. mode" modes.
When you activate SEARCH mode (button F2 from "Panorama" mode) message is displayed on screen that accompanies the process of signal detection (Figure 25).
Upon completion of the search process, forming a table presented in Figure 26, where the numbers denote:

1. total number of detected signals
2. number of detected signal in table
3. the central frequency of the detected signal
4. the relative level of the detected signal
5. Additional information about the signal
6. Current position indicator line in the list
7. an indicator of changes in the relative level of the selected signal (shown in green DC component)
8. an indicator of changes in the relative level of the selected signal (shown in red pulse component)
9. Display currently active demodulator (AM / FM).

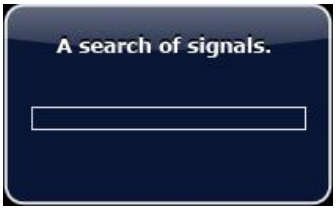

Figure 25

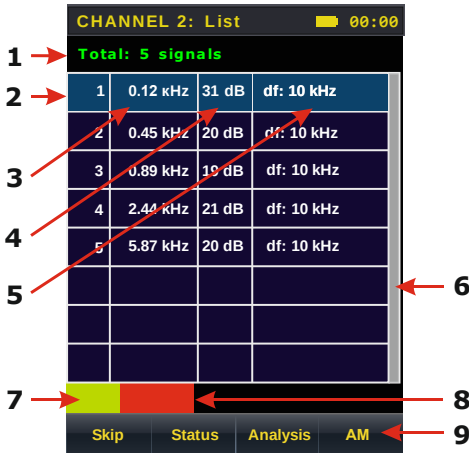

Figure 26

Available functions	Key
The choice of the signal in the list. Selected signal is displayed as a highlighted line	**UP or DOWN**
Listening to the selected demodulated signal on the speaker or headphones.	
Monitoring changes in the relative signal level of the indicator (item 7, 8)	
Remove signal from the list	F1
Assignment of signal status. The options are:	Press **F2** several times to choose appropriate status
"Dangerous" - red label	
"Known" - green label	
"Unknown" - white label	
Switch demodulator mode AM/FM	**F4**
Call of contexts tips	**HELP**
Available modes	
"Analysis"	**F3**
Output mode "Panorama" without saving results	**ESC**

3.4.5. "Analysis" mode

The regime is intended to clarify the parameters of the signals detected in the automatic mode. In general, the work unit in the "Analysis" is similar to working in the "fixed rate" (p.2.4.3), except that in this case, it is possible to save your changes.
Activate “Analysis” mode - press F4 button in "SEARCH" mode.
Mode screen is shown in Fig.27.
The numbers indicated in the figure:

1. value of the center frequency of the selected signal;
2. select demodulator (AM or FM);
3. an indicator of changes in the relative level of the selected signal (shown in red pulse component);
4. an indicator of changes in the relative level of the selected signal (shown in green DC component).

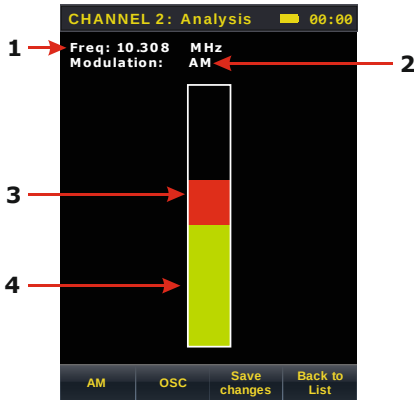

Figure 27

Available functions	Key
Control of the relative signal level according to the indicator (item 3, 4, Figure 27)	
Listening to the demodulated signal on speaker or headphones	
Adjust the center frequency of the signal (item 1 in Figure 27	**LEFT or RIGHT**
Changing type of demodulator (AM/FM)	**F1**
Call of contexts tips	**HELP**
Available modes	
"Oscilloscope"	**F2**
Exit from current mode:	
to the table of detected signals without saving the changed value of the center frequency of the signal	**F4 or ESC**
to the table of detected signals while preserving the values of the modified center frequency of the signal	**F3**

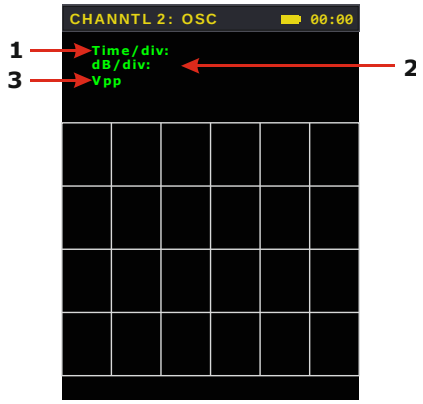

Figure 28

"Oscilloscope" Submode

Submode is activated from “Analysis” mode by pressing F2 button. Screen "Oscilloscope" submode is presented in Figure 28.

The numbers indicated in the figure:

1. value of dividing the time axis
2. value of amplitude axis scale (dB)
3. measured value of the signal amplitude (dB)

Available functions	Key
Acoustic control of demodulated signal	
Visual inspection of demodulated signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 µs / div, 1, 3, 6 ms / div	LEFT or RIGHT
Scale change of fission axis amplitude: 3 or 15 dB / div	UP or DOWN
Call of contexts tips	HELP
Exit to “Analysis” mode	ESC

3.4.6. Recommendations for the use of ST031M in scanning receiver (Channel 2) mode

Using ST031M in scanning receiver mode is focused on the discovery of channels used by special technical means of obtaining secret information (STMOSI), transmitting the signal off-site by power and low-current lines in the frequency range 0.05-30 MHz.

As can be seen from the description of modes of scanning receiver, in many respects they are similar to the modes implemented in a selective high-frequency detector. However, the use of these modes is different in some way. This is due to the specifics of performing search of wired STMOSI.

For example, using a scanning receiver cannot locate the source of the signal detected by the methods described in the "Channel 1". The main objective of using a scanning receiver ST031 - the discovery of the fact of illegal transmission of signals from the scanned area of a wire lines (within the range of operating frequencies, "Channel 2"). These lines can be:

- mains
- telephone lines
- line of security and fire alarm
- lines of computer networks
- cable television lines
- radio retranslation lines, etc.

When analyzing received information, signals to be considered as dangerous:

- demodulated signals are correlated with the signal source reference tone set in the scanned area (this is typical for analog STMOSI, the un encoded transmission channel and a relatively simple types of encoding);
- which levels are much higher than the background noise and interference;
- broadband signals.

It is required from operator not only the ability to work with the search appliance, but also the possession of information about the inspected object:

- what types of wire lines are installed in inspected premises;
- lines installation scheme;
- possibility of unauthorized access to the lines from the outside of inspected premises, etc.

Strict adherence to the rules of electrical safety is very important, when checking lines. Life-threatening voltage is applied to the device adapter.

In general, the verification of wire lines is as follows:

- Scanning frequency range characteristic of the wired STMOSI and detection of the most powerful signals.
- Investigation of detected signals (estimated informativeness of demodulated signals, determining the form of modulation of analog signals and their correlation with the acoustic environment of inspected premises, analysis of waveforms of digital signals, etc.).
- Identification of dangerous signals.

Since the device has two types of search (manual - mode "Panorama" and the automatic - mode "Search"), the difference in the proposed search options is only in the method of signal detection. Further action on the analysis and identification of signals in both methods are identical.

The proposed further uses ST031M are typical and may be adjusted depending on the characteristics of the object and the tasks faced by search operators.

3.4.6.1. Search using automated signal detection mode

This search option is essential. Its main advantages are simplicity and minimal signals detection time.

When checking power lines, it is recommended to search with attenuator switched-on!

No.	Action	Control element	Indication
	Preparation		
1.	Connect BWLC031M adapter to scanning receiver socket "SH2" (adapter jack and base unit socket are marked in red), and headphones to the «PHONE» socket in the bottom panel. **WARNING!** Connecting the BWLC031M adapter to the other sockets of ST031M is forbidden!		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings" and press ENTER; - Press the F4 button	Screen "Settings" mode. Figure 8.
5.	Perform the necessary settings change and exit the into the "Channel selection" mode	In accordance with Clause 2.2.1.	
6.	Enter into the "Channel 2" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 2" and press ENTER; - Press F2 button	Scanning receiver base mode "Panorama" Figure 21.
7.	Switch-on attenuator (necessary in case of checking power lines, in case of checking low current lines – depends on band spectrum load)	Button F3	Attenuator indicator becomes active
	Signals detection		
8.	Enable automatic search mode	F2 button	The message as in Fig.25 will be shown on screen. Upon completion of the automatic search, results will be generated and presented on-screen table (list) of detected signals, arranged in ascending order of their center frequency. By default, cursor is located on the first row of the table. Fig.26
	Detected signals analysis		
9.	Select signal	Use UP or DOWN set table pointer to a string containing information about the signal of interest.	In headphones listen to demodulated signal. The indicator (position 7, 8, Fig.26) shows the relative level of constant and pulsed signal components

10.	Evaluation of modulation type	Button F4	The default mode is AM. Pressing F4 toggles the demodulator to the FM (which is displayed on the screen). Pressing F4 again, returns the AM. You must connect the various demodulators to determine which of them gives better acoustic quality of the signal.
If the demodulated signal correlates with the acoustic environment in inspected room or control sound, then it means that STMOSI device is installed in room and transmits information by wire under test. Signal must be treated as "Dangerous" (button F2). The localization of such a device can be made by reducing the volume of the control sound source, and moving it around the room. In this demodulated signal is monitored in the headphones. Approximate STMOSI installation location will coincide with the place where the demodulated signal had better quality.			
In case of detection of broadcast station signals on the known frequencies, such signals can be assigned with status “Known”, or deleted from the list by pressing F1			
If the detected signal is demodulated, and its frequency does not coincide with the frequencies of the broadcast stations (operating in the scanned frequency range), the signal must be analyzed in more detail.			
11.	Switch-on “Analyze” mode	Button F3	“Analyze” screen mode. Listen to demodulated signal. Indicator shows constant and impulse components of the signal.
12.	Adjustment of signal central frequency	Buttons LEFT or Right	By observing changes in relative level of the signal and listening to the demodulated signal, set the frequency corresponding to the maximum signal level and the best signal quality in the headphones.
13.	Exit from the "Analysis" submode to the table of detected signals	With saving changes - F3 button Without saving changes - Button F4 or ESC	When you press F3, detected signal parameters in the table will change in accordance with the corrections made.
14.	Changing status of the signal	Successive pressing F2	Font color changes

3.4.6.2. Search using manual signal detection mode

This search option is a subsidiary. Recommended to use on wire lines with high levels of background noise.

No.	Action	Control element	Indication
Preparation			
1.	Connect BWLC031M adapter to scanning receiver socket "SH2" (adapter jack and base unit socket are marked in red), and headphones to the «PHONE» socket in the bottom panel. **WARNING!** Connecting the BWLC031M adapter to the other sockets of ST031M is forbidden!		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings" and press ENTER; - Press the F4 button	Screen "Settings" mode. Figure 8.

5.	Perform the necessary settings change and exit the into the "Channel selection" mode	In accordance with Clause 2.2.1.	
6.	Enter into the "Channel 2" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 2" and press ENTER; - Press F2 button	Scanning receiver base mode "Panorama" Figure 21.
7.	Switch-on attenuator (necessary in case of checking power lines, in case of checking low current lines – depends on band spectrum load)	Button F3	Attenuator indicator becomes active
Setting band limits			
If the band load range is not uniform, it is recommended to set the range in accordance with the boundaries of areas of interest. This is convenient in terms of following fine-tuning the marker on the frequency of the signal of interest.			
8.	Setting central frequency of the band	Buttons LEFT or RIGHT	First it is necessary to define the start and end frequency range of bandwidth area in which search will be performed. Then determine center frequency of the resulting range. Set the marker to central frequency.
9.	Band scaling	Buttons UP or DOWN	Set the desired width of the band (with respect to frequency, corresponding to position of screen marker).
Compensation of interference signals			
Connect one of adapter's probes to one of the wire of two wires line which is under testing.			
10.	Switch-on differential mode	Button F1	The level of the previously detected signals is taken as zero. Display shows the differential spectrum.
Signals detection			
Connect adapter’s second probe of the second wire of the test line. The spectral image on the screen will change. A screen will show the difference signal levels. In the ideal case, the spectrogram shows signals characteristic lines tested.			
11.	"Rough" signal adjustment	Buttons LEFT or RIGHT	Set screen market to signal of interest
12.	Signal control on fixed frequency	Button F3	“Fixed frequency” screen mode
13.	Fine tuning	Buttons LEFT or RIGHT	By monitoring indicator value, set the frequency where signal level is maximal.
14.	Evaluation of modulation type	Button F1	By changing modulation type, achieve best quality of demodulated signal.
If the demodulated signal correlates with the acoustic environment in inspected room or control sound, then it means that STMOSI device is installed in room and transmits information by wire under test. Signal must be treated as "Dangerous" (button F2). The localization of such a device can be made by reducing the volume of the control sound source, as it was described in earlier.			
Repeat steps 11-14 for all powerful signals which appears in differential spectrum.			

3.5. "CHANNEL 3" Mode. Low-frequency amplifier.

Low-frequency amplifier of ST031M is designed for detection and qualitative assessment of:

- STMOSI channels in the LF range 0.02 - 100 kHz
- low-frequency channels of information leakage of natural origin.

In low-frequency amplifier mode, ST031M is connected to the tested wire lines with the help of an adapter BAC031M.

Enabling LF made from the regime, "Channel selection" when you select "Channel 3", or by pressing F3.
The screen mode is presented in the form of an oscilloscope (Fig.29)
The numbers indicated in the figure:

1. set the value of time axis dividing
2. vertical scaling of waveform
3. measured value of the signal amplitude (dB)
4. RMS amplitude of the signal
5. Display gain coefficient.

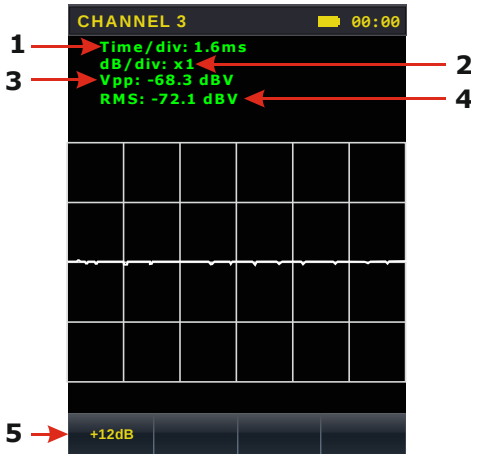

Figure 29

Available functions	**Key**
Acoustic control of demodulated signal	
Visual inspection of demodulated signal waveform	
Changing the scale interval of the time axis: 100, 200, 400, 800 µs / div, 1, 3, 6 ms / div	**LEFT or RIGHT**
Vertical scaling of oscilogram: x1, x2, x4	**UP or DOWN**
Setting gain coefficient: +12, +24, +36, +48	**F1**
Call of contexts tips	**HELP**
Exit to “Fixed frequency” mode	**ESC**

Notes for the use of low-frequency modes in the ST031M amplifier (Channel 3)

The use of low-frequency amplifier ST031M allows multiple search functions. Implementations of these functions are achieved by using special sensors or adapters. In basic ST031M set there is only one adapter - BAC031M. Other sensors included into ST331 instrument set, which is optional. Reference tone generator is required to detected signals. The following table lists the major search function of ST031M low frequency amplifier, and sensors/adapters, through which these functions are implemented.

Search function	**Detector/adapter**
Check low-current lines. Purpose - detection of acoustic signals, correlated with the reference tone signal	Adapter BAC031M included with ST031M
Check of building constructions for the presence of possible vibroacoustic leakage channel	Vibro transducer from ST331 optional instrument set
Check premises for the presence of an acoustic leakage channel	Testing microphone from ST331 optional instrument set
Check premises for the presence of an infrared STMOSI channel	Optical IR detector is included into ST331 optional instrument set
Detection of low-frequency magnetic fields, modulated by reference tone source	Magnetic antenna is included into ST331 optional instrument set

The following recommendations apply only to testing of wire lines, as ST031M set includes only wires adapter. Recommendations for use of other sensors are in ST331 user manual.

No.	**Action**	**Control element**	**Indication**
	Preparation		
1.	Connect LF amplifiers adapter to socket "SH3" and headphones to «PHONE» socket in the bottom panel. **WARNING!** ST031M base module must be switched-off while connecting any adapter to "SH3" socket. Connecting the BAC031M adapter to lines where voltage is more than 120 V is forbidden!		
2.	Switch-on the device	Turn the volume control clockwise.	Splash screen. Figure 6.
3.	Enter into the "Channel Selection" mode	Press any key on the keyboard	Screen "Channel selection" mode. Figure 7.
4.	Enter into the "Settings" mode (if required to change settings)	Two ways: - With the buttons UP or DOWN set the cursor to the "Settings" and press ENTER; - Press the F4 button	Screen "Settings" mode. Figure 8.
5.	Perform the necessary settings adjustment and exit into the "Channel selection" mode	In accordance with Clause 2.2.1.	
6.	Enter into the "Channel 3" mode	Two ways: - With the buttons UP or DOWN set the cursor to the "Channel 3" and press ENTER; - Press F3 button	Base mode of low frequency amplifier Figure 29.
7.	Connect adapter probes to tested wires		Demodulated signal oscilogram is displayed on screen. Listen to demodulated signal on headphones.

When testing phone lines, computer networks, or other wire lines having RJ45 connectors it is recommended to use special adapter (position 7 Figure 4).			
8.	Adjust amplification	Button F1	In pos.5 Fig. 29 value of the gain is indicated
Hearing of reference sound on headphones indicates presence of a microphone or microphone effect from equipment connected to tested lines.			

3.6. Operating ST031M with a personal computer

Operate **ST031M** with a personal computer (PC) by using the program **ST031M-Piranha**.

Main features:

- Control device function duplication
- Display ST031M graphic information on PC monitor
- Archiving of information received from ST031M on PC hard drive
- A software upgrade (firmware inside ST031M).

3.6.1. The program ST031M-Piranha

Program installation

Installation file «ST031m_piranha_0_9b.exe» is located on a USB flash card that is included with the device. To install the software run the file «ST031m_piranha_0_9b.exe» and follow the instructions.

If the base module ST031M is not connected to the computer, status bar indicates status as «Disconnected» (Figure 30).

The user can only access "Settings" menu item.

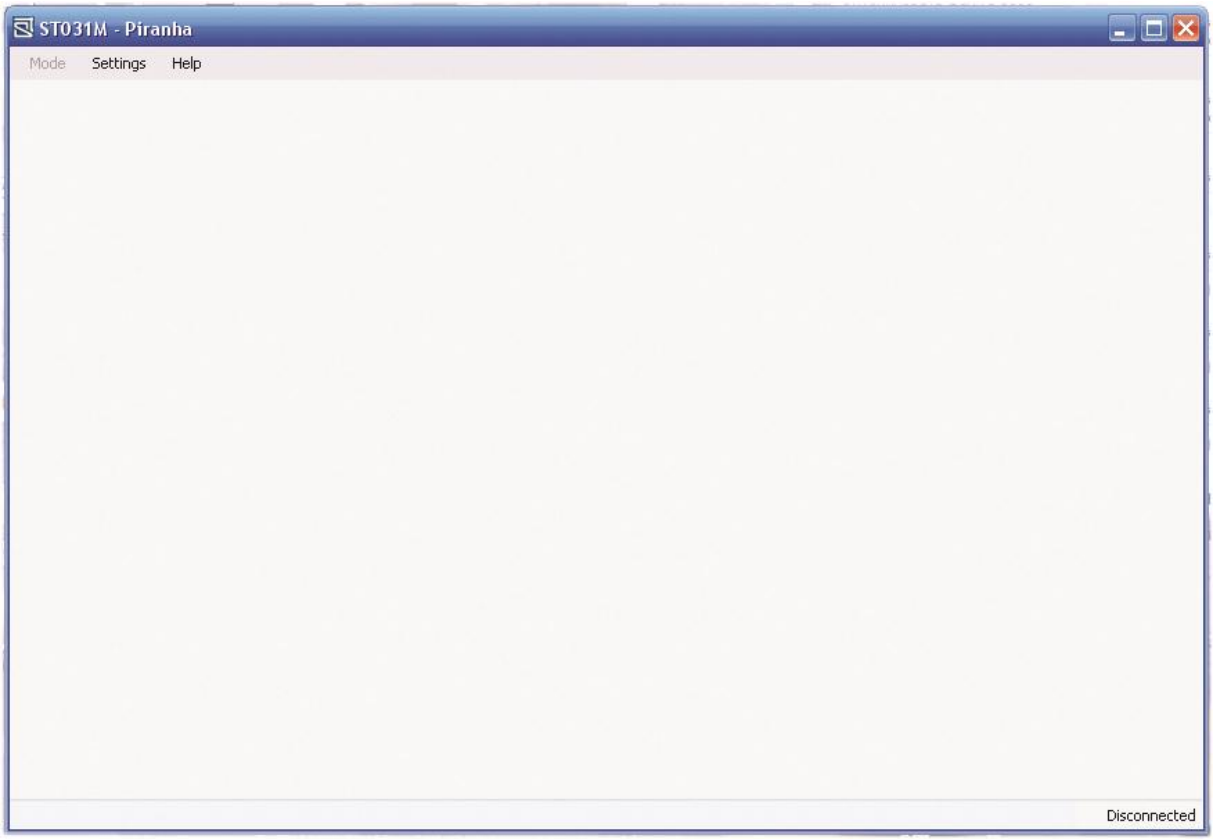

Figure 30

Connect ST031M base module to USB port. Switch-on ST031M. Program status bar change status to “Connected”

User can access following menu items:

1. “Modes” – select one of 3 channels
2. “Settings” – chose interface language and automatic updates.
3. “Help” -> “Updates” – update device firmware or PC software.

“Channel 1” mode (corresponds to selective detector HF mode).

“Channel 1” mode can be accessed on menu bar: "Mode" -> "Channel 1" (Figure 31)

In the graphics area of the window displays information corresponding to the "Panorama" mode.

Chose "Search", "Wireless Networks" or "Fixed frequency" mode by pressing the corresponding button on the left of the graphics area.

When you click on the button with the camera's icon, current image is saved in the folder «Smersh Technics» (created automatically) on the C drive on your computer HDD.

Created image file has a name like "dd.mm.yyyy chch.mm.ss.jpg" that includes the date and time of the image (example: 01.01.2012 12.30.00.jpg - picture taken January 1st, 2012 at 12 h 30 minutes. 00 sec.).

Figure 31

When you move the mouse pointer over the graphics area, a line of light gray color is displayed. When you press a mouse button, marker is set to this line. Scaling (change step) is carried out with the mouse wheel while the pointer should be in the graphics area.

"Search" mode

Displays table of detected signals (Fig. 32). Skip signal, status change, the transition to the signal analysis mode and exit to "Panorama" mode of the first channel is accomplished by pressing corresponding button on the left of the graphics area. When you click on the Excel icon program opens Microsoft Excel (if installed on your computer). The data are transferred from table to Excel and can be edited later.

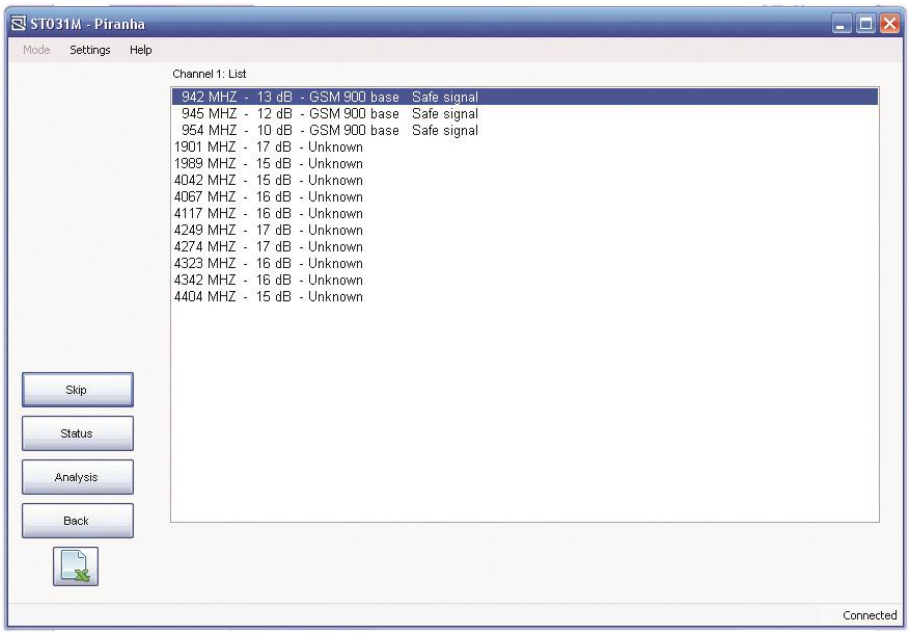
ST031M - Piranha
Mode
Settings
Help
Channel 1: List
942 MHZ - 13 dB - GSM 900 base Safe signal
945 MHZ - 12 dB - GSM 900 base Safe signal
954 MHZ - 10 dB - GSM 900 base Safe signal
1901 MHZ - 17 dB - Unknown
1989 MHZ - 15 dB - Unknown
4042 MHZ - 15 dB - Unknown
4067 MHZ - 16 dB - Unknown
4117 MHZ - 16 dB - Unknown
4249 MHZ - 17 dB - Unknown
4274 MHZ - 17 dB - Unknown
4323 MHZ - 16 dB - Unknown
4342 MHZ - 16 dB - Unknown
4404 MHZ - 15 dB - Unknown
Skip
Status
Analysis
Back
Connected

Figure 32

"Wireless Networks" mode

Data shown is from the screen of ST031M device (fig. 33). Operator can activate or deactivate detected standarts on the left part of the screen. Press button with camera icon to save screen image. Click "Back" button to exit to "Panorama" mode of the first channel.

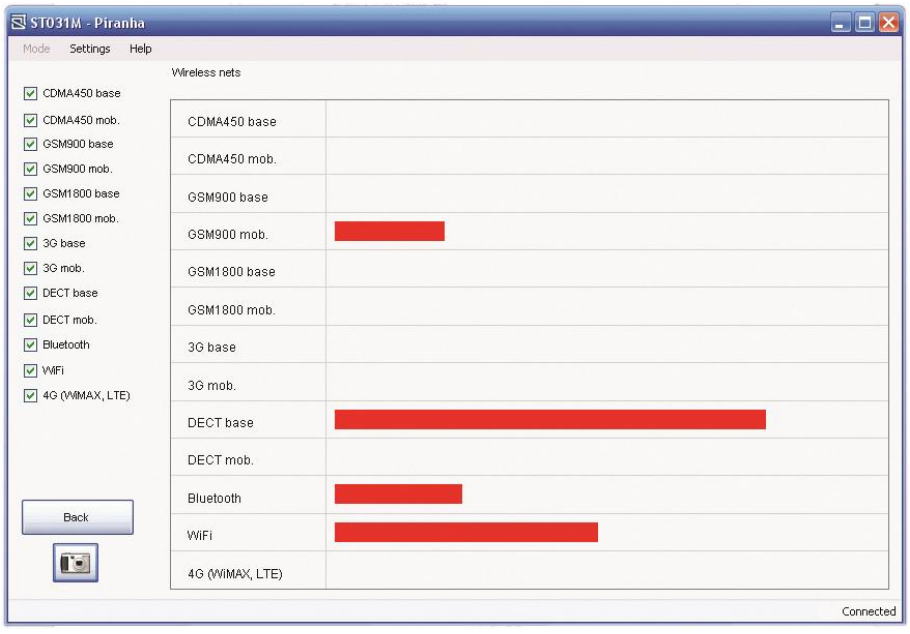

Figure 33

"Fixed frequency" mode

Window (Fig. 34) consists of two parts. The right side displays information from device screen (continuous and pulse level of the selected signal). On the left part spectrum is displayed in the selected range of frequencies. You can change the selected signal by clicking mouse on the appropriate reading. The image can be saved by pressing the button with the camera icon. Go into the "Oscilloscope" mode by pressing corresponding button on the left of the graphics area. "Back" button - exit to "Panorama" mode of the first channel.

Figure 34

"Oscilloscope" mode

Screen displays selected signal waveform (Figure 35). Scale screen by using mouse wheel while the mouse pointer must be inside the graphics area. The image can be saved by pressing the camera icon. Exit to previous mode (fixed frequency) by pressing "Back".

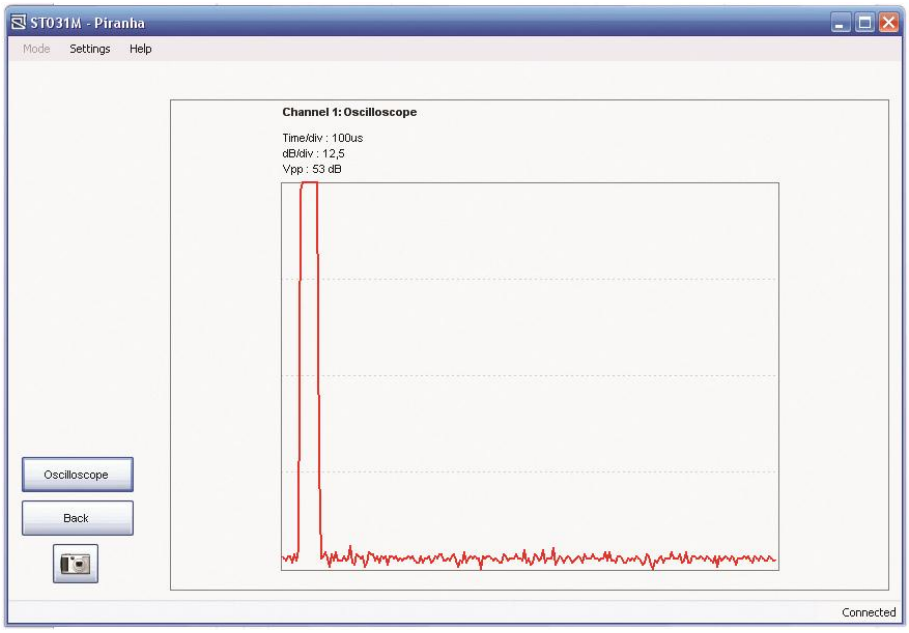

Figure 35

"CHANNEL 2" mode

Activate mode from main menu: "Mode" -> "2 Channel"

Information from the screen of the device is displayed in graphics area (Fig. 36).

When you move the mouse pointer over the graphics area it displays a line of light gray color. When you press a mouse button, the marker is set to this line. Scaling (change pitch) is carried out with the mouse wheel while the pointer should be in the graphics area.

Mode "Fixed frequency" of the second channel is similar to "Fixed rate" of the first channel.

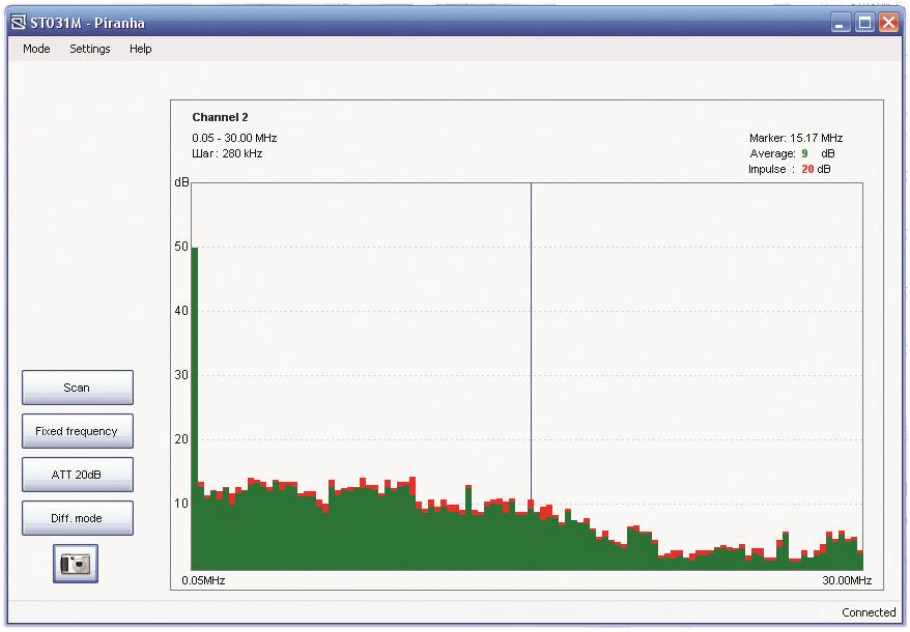

Figure 36

"Search" mode

Displays table of detected signals. Skip signal, change signal status, enter to signal analysis mode and exit to previous mode of the first channel are accomplished by pressing corresponding button on the left of the graphics area.

Data can be transferred to Microsoft Excel for later analysis. Pressing "Analysis" button – enter to mode of signal analysis.

"CHANNEL 3" mode

Display waveform of signal. Scaling (change pitch) is carried out with the mouse wheel while the pointer should be in the graphics area.

“Settings” menu

Language selection is done in main menu bar choosing "Settings".

"Help" menu

To start update ST031M software execute the command: "Help" -> "Update"

In this mode, checks for new version of firmware and software (if you have an Internet connection). If there is a new version, a message is displayed and the button "Download" becomes active (Fig.37).

When you click "Download" button, BIOS file saved on your computer at:

C: \ Smersh Technics \ Update.

To install the new firmware, use the ST031M update program.

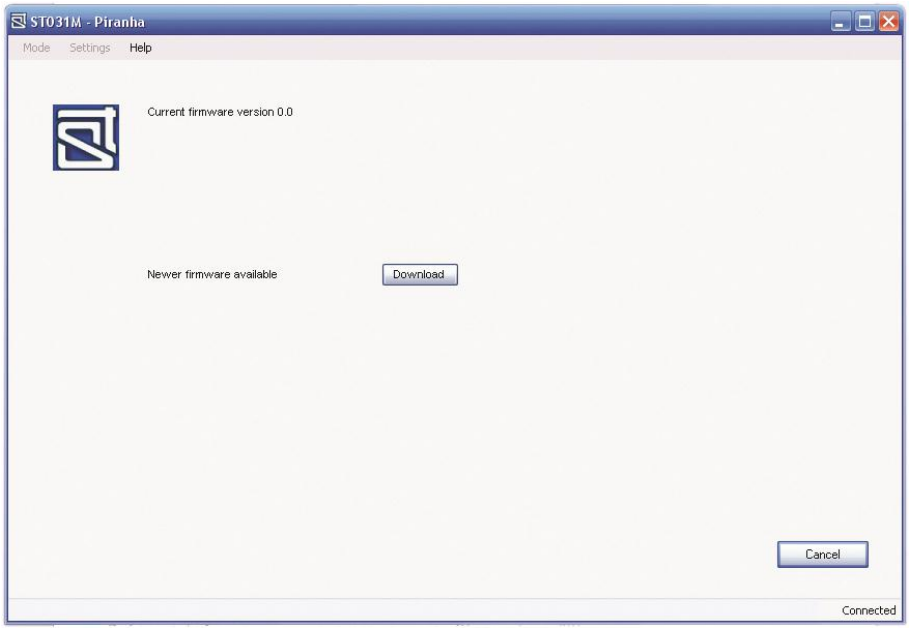

Figure 37

ST031M update program

Select firmware file by clicking Browse.

Open **Smersh Technichs** folder on disk C, and then folder **Update** select firmware file and press Open

Press “Load”. After finishing firmware update, window will close automatically. Switch-off and switch-on the device as it is suggested on the screen.

4. ST031M power supply

ST031M powered by a built-in lithium-polymer battery. Instrument could be operated when in AC mode (via the power supply / charging pos. 3 Figure 7).

A fully charged battery ensures continuous operation of the device for up to 7 hours. Charging status is controlled by the indicator (position 3. Figure 7).

Battery charging is made by means of the block (Fig. 4 item No. 12). Full-charge time - 7 hours.

Connect charging adapter to device «DC 5V» socket on the bottom of the unit and connect charger to the AC mains (220V/50Hz).

«POWER» indicator states:

- Orange – charging;
- Green – charging complete;

Batteries can be charged while unit is in operation however charging time increases.

5. Glossary of terms

TSCM – Technical Surveillance Counter Measures

STM – Special Technical Means

STMOSI - Special Technical Means of Obtaining Secret Information

HF – High Frequency

LF – Low Frequency